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13150-70089US.ST25
SEQUENCE LISTING

<110> Minerva Biotechnologies Corporation
BAMDAD, Cynthia, C.

<120> Techniques and Compositions for the Diagnosis and Treatment of
Cancer (MUC1)

<130> 13150-70089US

<140> PCT/US2004/027954
<141> 2004-08-26

<150> US 60/498,260
<151> 2003-08-26

<160> 66

<170> PatentIn version 3.3

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Thr Glu Ala Ala Ser Pro Tyr Asn Leu Thr Ile Ser Asp Val Ser Val
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Ser His His His His His His
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Ser Asp Val Pro Phe Pro Phe Ser Ala Gln Ser Gly Ala His His His
35 40 45

His His His

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Val Glu Thr Gln Phe Asn Gln Tyr Lys Thr Glu Ala Ala Ser Pro Tyr
 20 25 30

Asn Leu Thr Ile Ser Asp Val Ser Val Ser Asp Val Pro Phe Pro Phe
 35 40 45

His His His His His His
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Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro
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 Pro Ala His Gly Val Thr Ser Ala His His His His His His
 35 40 45

<210> 6
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Gly Thr Ile Asn Val His Asp Val Glu Thr Gln Phe Asn Gln Tyr Lys
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 Thr Glu Ala Ala Ser Pro Tyr Asn Leu Thr Ile Ser Asp Val Ser Val
 20 25 30

Ser

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 20 25 30

Ser Asp Val Pro Phe Pro Phe Ser Ala Gln Ser Gly Ala
 35 40 45

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 Val Gln Leu Thr Leu Ala Phe Arg Glu
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 Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro
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 Pro Ala His Gly Val Thr Ser Ala
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 Val Leu Thr Val Val Thr Gly Ser Gly His Ala Ser Ser Thr Pro Gly
 20 25 30
 Gly Glu Lys Glu Thr Ser Ala Thr Gln Arg Ser Ser Val Pro Ser Ser
 35 40 45
 Thr Glu Lys Asn Ala Val Ser Met Thr Ser Ser Val Leu Ser Ser His
 50 55 60
 Ser Pro Gly Ser Gly Ser Ser Thr Thr Gln Gly Gln Asp Val Thr Leu
 65 70 75 80
 Ala Pro Ala Thr Glu Pro Ala Ser Gly Ser Ala Ala Thr Trp Gly Gln
 85 90 95
 Asp Val Thr Ser Val Pro Val Thr Arg Pro Ala Leu Gly Ser Thr Thr
 100 105 110
 Pro Pro Ala His Asp Val Thr Ser Ala Pro Asp Asn Lys Pro Ala Pro
 115 120 125
 Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
 130 135 140
 Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
 145 150 155 160
 Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
 165 170 175
 Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
 180 185 190
 Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
 195 200 205
 Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
 210 215 220
 Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser

225					230								235								240
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Gly	Val	Thr	Ser 260	Ala	Pro	Asp	Thr	Arg 265	Pro	Ala	Pro	Gly	Ser 270	Thr	Ala						
Pro	Pro	Ala 275	His	Gly	Val	Thr	Ser 280	Ala	Pro	Asp	Thr	Arg 285	Pro	Ala	Pro						
Gly	Ser 290	Thr	Ala	Pro	Pro	Ala 295	His	Gly	Val	Thr	Ser 300	Ala	Pro	Asp	Thr						
Arg 305	Pro	Ala	Pro	Gly	Ser 310	Thr	Ala	Pro	Pro	Ala 315	His	Gly	Val	Thr	Ser 320						
Ala	Pro	Asp	Thr	Arg 325	Pro	Ala	Pro	Gly	Ser 330	Thr	Ala	Pro	Pro	Ala	His 335						
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Pro	Pro	Ala 355	His	Gly	Val	Thr	Ser 360	Ala	Pro	Asp	Thr	Arg 365	Pro	Ala	Pro						
Gly	Ser 370	Thr	Ala	Pro	Pro	Ala 375	His	Gly	Val	Thr	Ser 380	Ala	Pro	Asp	Thr						
Arg 385	Pro	Ala	Pro	Gly	Ser 390	Thr	Ala	Pro	Pro	Ala 395	His	Gly	Val	Thr	Ser 400						
Ala	Pro	Asp	Thr	Arg 405	Pro	Ala	Pro	Gly	Ser 410	Thr	Ala	Pro	Pro	Ala	His 415						
Gly	Val	Thr	Ser 420	Ala	Pro	Asp	Thr	Arg 425	Pro	Ala	Pro	Gly	Ser 430	Thr	Ala						
Pro	Pro	Ala 435	His	Gly	Val	Thr	Ser 440	Ala	Pro	Asp	Thr	Arg 445	Pro	Ala	Pro						
Gly	Ser 450	Thr	Ala	Pro	Pro	Ala 455	His	Gly	Val	Thr	Ser 460	Ala	Pro	Asp	Thr						
Arg 465	Pro	Ala	Pro	Gly	Ser 470	Thr	Ala	Pro	Pro	Ala 475	His	Gly	Val	Thr	Ser 480						
Ala	Pro	Asp	Thr	Arg 485	Pro	Ala	Pro	Gly	Ser 490	Thr	Ala	Pro	Pro	Ala	His 495						
Gly	Val	Thr	Ser 500	Ala	Pro	Asp	Thr	Arg 505	Pro	Ala	Pro	Gly	Ser 510	Thr	Ala						
Pro	Pro	Ala 515	His	Gly	Val	Thr	Ser 520	Ala	Pro	Asp	Thr	Arg 525	Pro	Ala	Pro						
Gly	Ser 530	Thr	Ala	Pro	Pro	Ala 535	His	Gly	Val	Thr	Ser 540	Ala	Pro	Asp	Thr						
Arg 545	Pro	Ala	Pro	Gly	Ser 550	Thr	Ala	Pro	Pro	Ala 555	His	Gly	Val	Thr	Ser 560						

Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
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 Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
 580 585 590
 Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
 595 600 605
 Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
 610 615 620
 Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
 625 630 635 640
 Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
 645 650 655
 Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
 660 665 670
 Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
 675 680 685
 Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
 690 695 700
 Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
 705 710 715 720
 Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
 725 730 735
 Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
 740 745 750
 Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
 755 760 765
 Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
 770 775 780
 Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
 785 790 795 800
 Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
 805 810 815
 Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
 820 825 830
 Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
 835 840 845
 Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
 850 855 860
 Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
 865 870 875 880
 Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
 885 890 895

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Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
900 905 910

Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
915 920 925

Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Asn
930 935 940

Arg Pro Ala Leu Gly Ser Thr Ala Pro Pro Val His Asn Val Thr Ser
945 950 955 960

Ala Ser Gly Ser Ala Ser Gly Ser Ala Ser Thr Leu Val His Asn Gly
965 970 975

Thr Ser Ala Arg Ala Thr Thr Thr Pro Ala Ser Lys Ser Thr Pro Phe
980 985 990

Ser Ile Pro Ser His His Ser Asp Thr Pro Thr Thr Leu Ala Ser His
995 1000 1005

Ser Thr Lys Thr Asp Ala Ser Ser Thr His His Ser Ser Val Pro
1010 1015 1020

Pro Leu Thr Ser Ser Asn His Ser Thr Ser Pro Gln Leu Ser Thr
1025 1030 1035

Gly Val Ser Phe Phe Phe Leu Ser Phe His Ile Ser Asn Leu Gln
1040 1045 1050

Phe Asn Ser Ser Leu Glu Asp Pro Ser Thr Asp Tyr Tyr Gln Glu
1055 1060 1065

Leu Gln Arg Asp Ile Ser Glu Met Phe Leu Gln Ile Tyr Lys Gln
1070 1075 1080

Gly Gly Phe Leu Gly Leu Ser Asn Ile Lys Phe Arg Pro Gly Ser
1085 1090 1095

Val Val Val Gln Leu Thr Leu Ala Phe Arg Glu Gly Thr Ile Asn
1100 1105 1110

Val His Asp Val Glu Thr Gln Phe Asn Gln Tyr Lys Thr Glu Ala
1115 1120 1125

Ala Ser Arg Tyr Asn Leu Thr Ile Ser Asp Val Ser Val Ser Asp
1130 1135 1140

Val Pro Phe Pro Phe Ser Ala Gln Ser Gly Ala Gly Val Pro Gly
1145 1150 1155

Trp Gly Ile Ala Leu Leu Val Leu Val Cys Val Leu Val Ala Leu
1160 1165 1170

Ala Ile Val Tyr Leu Ile Ala Leu Ala Val Cys Gln Cys Arg Arg
1175 1180 1185

Lys Asn Tyr Gly Gln Leu Asp Ile Phe Pro Ala Arg Asp Thr Tyr
1190 1195 1200

His Pro Met Ser Glu Tyr Pro Thr Tyr His Thr His Gly Arg Tyr

1205

1210

1215

Val Pro Pro Ser Ser Thr Asp Arg Ser Pro Tyr Glu Lys Val Ser
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Ala Gly Asn Gly Gly Ser Ser Leu Ser Tyr Thr Asn Pro Ala Val
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Ala Ala Ala Ser Ala Asn Leu
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Ala Trp Lys Met Pro Arg Ser Cys Cys Ser Arg Ser Gly Ala Leu Leu
 35 40 45

Leu Ala Leu Leu Leu Gln Ala Ser Met Glu Val Arg Gly Trp Cys Leu
 50 55 60

Glu Ser Ser Gln Cys Gln Asp Leu Thr Thr Glu Ser Asn Leu Leu Glu
 65 70 75 80

Cys Ile Arg Ala Cys Lys Pro Asp Leu Ser Ala Glu Thr Pro Met Phe
 85 90 95

Pro Gly Asn Gly Asp Glu Gln Pro Leu Thr Glu Asn Pro Arg Lys Tyr
 100 105 110

Val Met Gly His Phe Arg Trp Asp Arg Phe Gly Arg Arg Asn Ser Ser
 115 120 125

Ser Ser Gly Ser Ser Gly Ala Gly Gln Lys Arg Glu Asp Val Ser Ala
 130 135 140

Gly Glu Asp Cys Gly Pro Leu Pro Glu Gly Gly Pro Glu Pro Arg Ser
 145 150 155 160

Asp Gly Ala Lys Pro Gly Pro Arg Glu Gly Lys Arg Ser Tyr Ser Met
 165 170 175

Glu His Phe Arg Trp Gly Lys Pro Val Gly Lys Lys Arg Arg Pro Val
 180 185 190

Lys Val Tyr Pro Asn Gly Ala Glu Asp Glu Ser Ala Glu Ala Phe Pro
 195 200 205

Leu Glu Phe Lys Arg Glu Leu Thr Gly Gln Arg Leu Arg Glu Gly Asp
 210 215 220

Gly Pro Asp Gly Pro Ala Asp Asp Gly Ala Gly Ala Gln Ala Asp Leu
 225 230 235 240

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Glu	His	Ser	Leu	Leu	Val	Ala	Ala	Glu	Lys	Lys	Asp	Glu	Gly	Pro	Tyr
				245					250					255	
Arg	Met	Glu	His	Phe	Arg	Trp	Gly	Ser	Pro	Pro	Lys	Asp	Lys	Arg	Tyr
			260					265					270		
Gly	Gly	Phe	Met	Thr	Ser	Glu	Lys	Ser	Gln	Thr	Pro	Leu	Val	Thr	Leu
		275					280					285			
Phe	Lys	Asn	Ala	Ile	Ile	Lys	Asn	Ala	Tyr	Lys	Lys	Gly	Glu		
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<223> Synthetic Peptide

<400> 13

His His His His His His Arg Gly Glu Phe Thr Gly Thr Tyr Ile Thr
1 5 10 15
Ala Val Thr

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<210> 14
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<400> 14

Thr Phe Ile Ala Ile Lys Pro Asp Gly Val Gln Arg
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<212> PRT
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<222> (3)..(3)
<223> Xaa can be any naturally occurring amino acid

<400> 15

Val Met Xaa Leu Gly Glu Thr Asn Pro Ala Asp Ser Lys Pro Gly Thr
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Ile Arg

<210> 16
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<400> 16

Val Met Leu Gly Glu Thr Asn Pro Ala Asp Ser Lys Pro Gly Thr Ile
1 5 10 15

Arg

<210> 17
<211> 10
<212> PRT
<213> Homo sapiens

<400> 17

Asn Ile Ile His Gly Ser Asp Ser Val Lys
1 5 10

<210> 18
<211> 9
<212> PRT
<213> Homo sapiens

<400> 18

Gly Leu Val Gly Glu Ile Ile Lys Arg
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<400> 19

Gly Leu Val Gly Glu Ile Ile Lys

1 5

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Tyr Met Xaa His Ser Gly Pro Val Val Ala Met Xaa Val Trp Glu Gly
 1 5 10 15

Leu Asn Val Val Lys
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<210> 21
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<400> 21

Ala Ala Phe Asp Asp Ala Ile Ala Glu Leu Asp Thr Leu Ser Glu Glu
 1 5 10 15

Ser Tyr Lys

<210> 22
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Ile Arg

<210> 23

<211> 11
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<400> 23

Tyr Leu Ala Glu Phe Ala Thr Gly Asn Asp Arg
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<400> 24

Asp Ser Thr Leu Ile Met Gln Leu Leu Arg
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<210> 25
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<400> 25

Tyr Asp Glu Met Val Glu Ser Met Lys
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<400> 27

His Leu Ile Pro Ala Ala Asn Thr Gly Glu Ser Lys
 1 5 10

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<213> Homo sapiens

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<222> (12)..(12)

<223> Xaa can be any naturally occurring amino acid

<400> 28

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Asp Ser Lys

<210> 29

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Asp Pro Asp Ala Gln Pro Gly Gly Glu Leu Met Leu Gly Gly Thr Asp
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Ser Lys

<210> 30

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<222> (15)..(15)

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Gln Lys

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<212> PRT

<213> Homo sapiens

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Ile Ser Val Asn Asn Val Leu Pro Val Phe Asp Asn Leu Met Gln Gln
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Lys

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Gln Pro Gly Ile Thr Phe Ile Ala Ala Lys
1 5 10

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<400> 33

Gly Leu Gly Thr Asp Glu Glu Ser Ile Leu Thr Leu Leu Thr Ser Arg
1 5 10 15

<210> 34
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<213> Homo sapiens

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Asp Leu Leu Asp Asp Leu Lys Ser Glu Leu Thr Gly Lys
1 5 10

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<400> 35

Ser Glu Ile Asp Leu Phe Asn Ile Arg
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<400> 36

Gly Thr Ile Asn Val His Asp Val Glu Thr Gln Phe Asn Gln Tyr Lys
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Thr Glu Ala Ala Ser Arg Tyr Asn Leu Thr Ile Ser Asp Val Ser Val
20 25 30

Ser Asp Val Pro Phe Pro Phe Ser Ala Gln Ser Gly Ala
35 40 45

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13150-70089US.ST25

<212> PRT
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<400> 37

Gly Thr Ile Asn Val His Asp Val Glu Thr Gln Phe Asn Gln Tyr Lys
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Thr Glu Ala Ala Ser Arg Tyr Asn Leu Thr Ile Ser Asp Val Ser Val
20 25 30
Ser Asp Val Pro Phe Pro Phe Ser Ala Gln Ser Gly Ala Gly Val Pro
35 40 45
Gly Trp Gly Ile Ala Leu Leu Val Leu Val Cys Val Leu Val Ala Leu
50 55 60
Ala Ile Val Tyr Leu Ile Ala Leu Ala Val Cys Gln Cys Arg Arg Lys
65 70 75 80
Asn Tyr Gly Gln Leu Asp Ile Phe Pro Ala Arg Asp Thr Tyr His Pro
85 90 95
Met Ser Glu Tyr Pro Thr Tyr His Thr His Gly Arg Tyr Val Pro Pro
100 105 110
Ser Ser Thr Asp Arg Ser Pro Tyr Glu Lys Val Ser Ala Gly Asn Gly
115 120 125
Gly Ser Ser Leu Ser Tyr Thr Asn Pro Ala Val Ala Ala Ala Ser Ala
130 135 140
Asn Leu
145

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<400> 38

Gly Phe Leu Gly Leu Ser Asn Ile Lys Phe Arg Pro Gly Ser Val Val
1 5 10 15
Val Gln Leu Thr Leu Ala Phe Arg Glu Gly Thr Ile Asn Val His Asp
20 25 30
Val Glu Thr Gln Phe Asn Gln Tyr Lys Thr Glu Ala Ala Ser Arg Tyr
35 40 45
Asn Leu Thr Ile Ser Asp Val Ser Val Ser Asp Val Pro Phe Pro Phe
50 55 60
Ser Ala Gln Ser Gly Ala Gly Val Pro Gly Trp Gly Ile Ala Leu Leu
65 70 75 80
Val Leu Val Cys Val Leu Val Ala Leu Ala Ile Val Tyr Leu Ile Ala
85 90 95
Leu Ala Val Cys Gln Cys Arg Arg Lys Asn Tyr Gly Gln Leu Asp Ile
100 105 110

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Phe Pro Ala Arg Asp Thr Tyr His Pro Met Ser Glu Tyr Pro Thr Tyr
 115 120 125
 His Thr His Gly Arg Tyr Val Pro Pro Ser Ser Thr Asp Arg Ser Pro
 130 135 140
 Tyr Glu Lys Val Ser Ala Gly Asn Gly Gly Ser Ser Leu Ser Tyr Thr
 145 150 155 160
 Asn Pro Ala Val Ala Ala Ala Ser Ala Asn Leu
 165 170

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 20 25 30
 Asp Ala Ser Ser Thr His His Ser Thr Val Pro Pro Leu Thr Ser Ser
 35 40 45
 Asn His Ser Thr Ser Pro Gln Leu Ser Thr Gly Val Ser Phe Phe Phe
 50 55 60
 Leu Ser Phe His Ile Ser Asn Leu Gln Phe Asn Ser Ser Leu Glu Asp
 65 70 75 80
 Pro Ser Thr Asp Tyr Gln Glu Leu Gln Arg Asp Ile Ser Glu Met
 85 90 95
 Phe Leu Gln Ile Tyr Lys Gln Gly Gly Phe Leu Gly Leu Ser Asn Ile
 100 105 110
 Lys Phe Arg Pro Gly Ser Val Val Val Gln Leu Thr Leu Ala Phe Arg
 115 120 125
 Glu Gly Thr Ile Asn Val His Asp Val Glu Thr Gln Phe Asn Gln Tyr
 130 135 140
 Lys Thr Glu Ala Ala Ser Arg Tyr Asn Leu Thr Ile Ser Asp Val Ser
 145 150 155 160
 Val Ser Asp Val Pro Phe Pro Phe Ser Ala Gln Ser Gly Ala Gly Val
 165 170 175
 Pro Gly Trp Gly Ile Ala Leu Leu Val Leu Val Cys Val Leu Val Ala
 180 185 190
 Leu Ala Ile Val Tyr Leu Ile Ala Leu Ala Val Cys Gln Cys Arg Arg
 195 200 205
 Lys Asn Tyr Gly Gln Leu Asp Ile Phe Pro Ala Arg Asp Thr Tyr His
 210 215 220

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Pro Met Ser Glu Tyr Pro Thr Tyr His Thr His Gly Arg Tyr Val Pro
 225 230 235 240
 Pro Ser Ser Thr Asp Arg Ser Pro Tyr Glu Lys Val Ser Ala Gly Asn
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 Gly Gly Ser Ser Leu Ser Tyr Thr Asn Pro Ala Val Ala Ala Ala Ser
 260 265 270
 Ala Asn Leu
 275

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 Asn Ser Ser Leu Glu Asp Pro Ser Thr Asp Tyr Tyr Gln Glu Leu Gln
 35 40 45
 Arg Asp Ile Ser Glu Met Phe Leu Gln Ile Tyr Lys Gln Gly Gly Phe
 50 55 60
 Leu Gly Leu Ser Asn Ile Lys Phe Arg Pro Gly Ser Val Val Val Gln
 65 70 75 80
 Leu Thr Leu Ala Phe Arg Glu Gly Thr Ile Asn Val His Asp Met Glu
 85 90 95
 Thr Gln Phe Asn Gln Tyr Lys Thr Glu Ala Ala Ser Arg Tyr Asn Leu
 100 105 110
 Thr Ile Ser Asp Val Ser Val Ser Asp Val Pro Phe Pro Phe Ser Ala
 115 120 125
 Gln Ser Gly Ala Gly Val Pro Gly Trp Gly Ile Ala Leu Leu Val Leu
 130 135 140
 Val Cys Val Leu Val Ala Leu Ala Ile Val Tyr Leu Ile Ala Leu Ala
 145 150 155 160
 Val Cys Gln Cys Arg Arg Lys Asn Tyr Gly Gln Leu Asp Ile Phe Pro
 165 170 175
 Ala Arg Asp Thr Tyr His Pro Met Ser Glu Tyr Pro Thr Tyr His Thr
 180 185 190
 His Gly Arg Tyr Val Pro Pro Ser Ser Thr Asp Arg Ser Pro Tyr Glu
 195 200 205
 Lys Val Ser Ala Gly Asn Gly Gly Ser Ser Leu Ser Tyr Thr Asn Pro
 210 215 220

Ala Val Ala Ala Thr Ser Ala Asn Leu
 225 230

<210> 41
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<400> 41

Leu Asp Pro Arg Val Arg Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
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 Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
 35 40 45
 Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
 50 55 60
 Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
 65 70 75 80
 Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
 85 90 95
 Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
 100 105 110
 Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
 115 120 125
 Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
 130 135 140
 Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
 145 150 155 160
 Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
 165 170 175
 Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
 180 185 190
 Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
 195 200 205
 Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
 210 215 220
 Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
 225 230 235 240
 Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
 245 250 255
 Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
 260 265 270
 Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser

275

280

285

Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
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 Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
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 Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
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 Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
 355 360 365
 Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
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 Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
 385 390 395 400
 Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
 405 410 415
 Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
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 Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
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 Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
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 Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
 465 470 475 480
 Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
 485 490 495
 Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
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 Pro Ala Ser Lys Ser Thr Pro Phe Ser Ile Pro Ser His His Ser Asp
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Thr Pro Thr Thr Leu Ala Ser His Ser Thr Lys Thr Asp Ala Ser Ser
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 Thr His His Ser Ser Val Pro Pro Leu Thr Ser Ser Asn His Ser Thr
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 Tyr Tyr Gln Glu Leu Gln Arg Asp Ile Ser Glu Met Phe Leu Gln Ile
 675 680 685
 Tyr Lys Gln Gly Gly Phe Leu Gly Leu Ser Asn Ile Lys Phe Arg Pro
 690 695 700
 Gly Ser Val Val Val Gln Leu Thr Leu Ala Phe Arg Glu Gly Thr Ile
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 Asn Val His Asp Val Glu Thr Gln Phe Asn Gln Tyr Lys Thr Glu Ala
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 Ala Ser Arg Tyr Asn Leu Thr Ile Ser Asp Val Ser Val Ser Asp Val
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 755 760 765
 Ile Ala Leu Leu Val Leu Val Cys Val Leu Val Ala Leu Ala Ile Val
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 Tyr Leu Ile Ala Leu Ala Val Cys Gln Cys Arg Arg Lys Asn Tyr Gly
 785 790 795 800
 Gln Leu Asp Ile Phe Pro Ala Arg Asp Thr Tyr His Pro Met Ser Glu
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 <212> DNA
 <213> Homo sapiens

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 <211> 1132
 <212> DNA
 <213> Homo sapiens

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 <213> Homo sapiens

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<211> 2487
<212> DNA
<213> Homo sapiens

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 <211> 19
 <212> PRT
 <213> Homo sapiens

<400> 47

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Val Leu Thr

<210> 48
 <211> 4003
 <212> DNA
 <213> Homo sapiens

<400> 48

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<220>

<223> PCR Primer

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<223> PCR Primer

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<223> PCR Primer

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<210> 57
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 <212> DNA
 <213> Artificial Sequence

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<223> PCR Primer

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32

<210> 58
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<400> 58

Met Thr Pro Gly Thr Gln Ser Pro Phe Phe Leu Leu Leu Leu Leu Thr
 1 5 10 15

Val Leu Thr Val Val Thr Ala

20

<210> 59
 <211> 24
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<400> 59

Met Thr Pro Gly Thr Gln Ser Pro Phe Phe Leu Leu Leu Leu Leu Thr
 1 5 10 15

Val Leu Thr Val Val Thr Ala Gly
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<400> 60

Thr Ile Asn Val His Asp Val Glu Thr Gln Phe Asn Gln Tyr Lys Thr
 1 5 10 15

Glu Ala Ala Ser Pro Tyr Asn Leu Thr Ile Ser Asp Val Ser Val Ser
 20 25 30

Asp Val Pro Phe Pro Phe Ser Ala Gln Ser Gly Ala His His His His
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His His
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<210> 61
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Ser Val Val Val Gln Leu Thr Leu Ala Phe Arg Glu Gly Thr Ile Asn
 1 5 10 15

Val His Asp Val Glu Thr Gln Phe Asn Gln Tyr Lys Thr Glu Ala Ala
 20 25 30

Ser Pro Tyr Asn Leu Thr Ile Ser Asp Val Ser Val Ser Asp Val Pro
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Phe Pro Phe Ser Ala Gln Ser Gly Ala His His His His His His
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His His His His His His Ser Val Val Val Gln Leu Thr Leu Ala Phe
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Arg Glu Gly

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<400> 63

Thr Ile Asn Val His Asp Val Glu Thr Gln Phe Asn Gln Tyr Lys Thr
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Glu Ala Ala Ser Arg Tyr Asn Leu Thr Ile Ser Asp Val Ser Val Ser
 20 25 30

Asp Val Pro Phe Pro Phe Ser Ala Gln Ser Gly Ala
 35 40

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Thr Ile Asn Val His Asp Val Glu Thr Gln Phe Asn Gln Tyr Lys Thr
 1 5 10 15

Glu Ala Ala Ser Pro Tyr Asn Leu Thr Ile Ser Asp Val Ser Val Ser
 20 25 30

Asp Val Pro Phe Pro Phe Ser Ala Gln Ser Gly Ala
 35 40

<210> 65
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<400> 65

Ser Val Val Val Gln Leu Thr Leu Ala Phe Arg Glu Gly
1 5 10

<210> 66

<211> 57

<212> PRT

<213> Homo sapiens

<400> 66

Ser Val Val Val Gln Leu Thr Leu Ala Phe Arg Glu Gly Thr Ile Asn
1 5 10 15

Val His Asp Val Glu Thr Gln Phe Asn Gln Tyr Lys Thr Glu Ala Ala
20 25 30

Ser Pro Tyr Asn Leu Thr Ile Ser Asp Val Ser Val Ser Asp Val Pro
35 40 45

Phe Pro Phe Ser Ala Gln Ser Gly Ala
50 55
3

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